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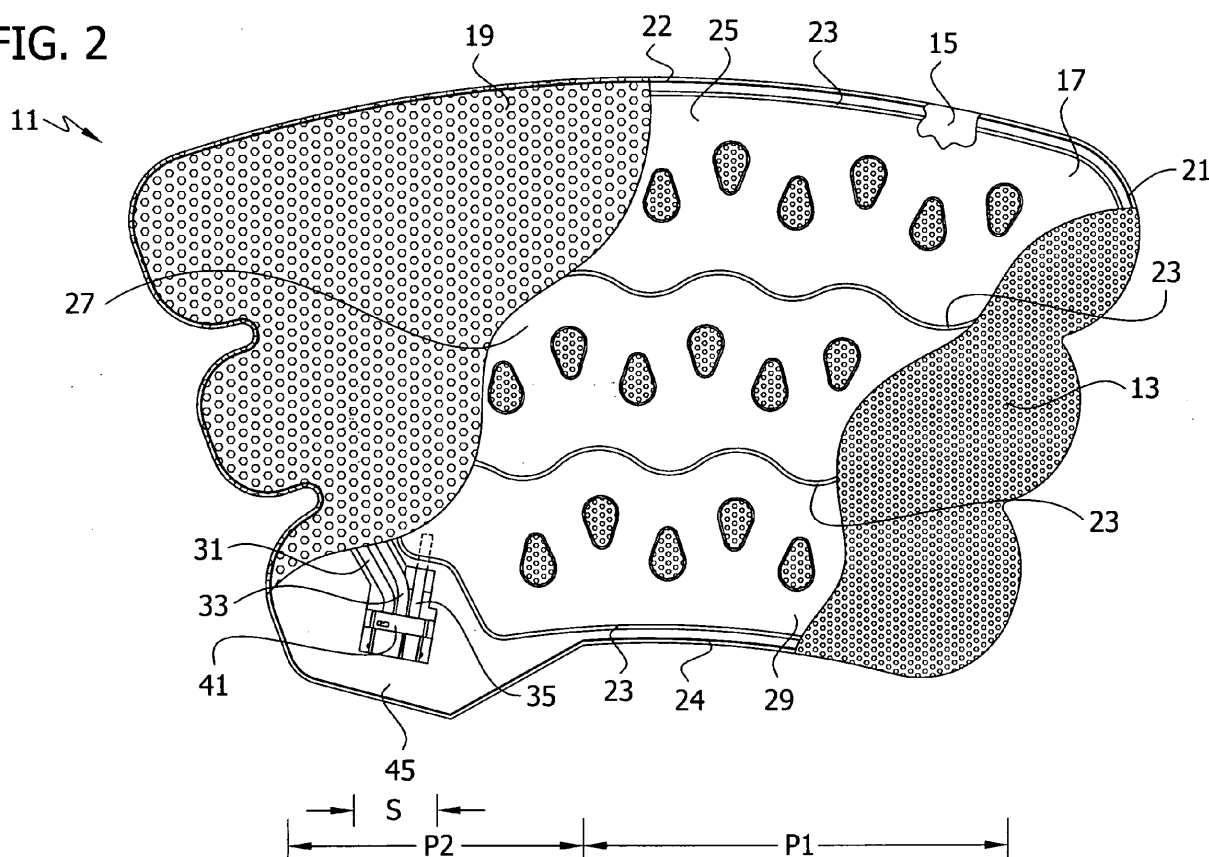
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(54) **Compression garment having an extension**

(57) A compression garment for applying compression therapy to a wearer's body including a compression sleeve (11) having a proximal edge (22) and a distal edge (24). The sleeve (11) includes at least one bladder (25, 27, 29). A tube (31, 33, 35) is attached to the bladder

(25, 27, 29). A connector (41) on the tube connects the tube to a source of compressed fluid for inflating the bladder. The distal edge (24) of the compression sleeve (11) has a first portion (P1) and a second portion (P2) jutting distally from the first portion (P1).

**FIG. 2**



## Description

### FIELD OF THE INVENTION

**[0001]** The present invention generally relates to compression sleeves, and more particularly to a compression sleeve having an extension portion.

### BACKGROUND OF THE INVENTION

**[0002]** Pneumatic compression sleeves can be used to apply intermittent compression therapy to a wearer's leg to prevent deep vein thrombosis (DVT). However, sleeves of this type can be used in other applications, including those in which a constant compression is applied during treatment. In a knee-length compression sleeve 1 of the prior art shown in Fig. 1, the sleeve comprises a plurality of inflatable bladders 3. Tubes 5 fluidly connect to respective bladders 3 to allow for independent inflation of each bladder. A connector 7 secured to distal ends of the tubes 5 is configured for attachment to a mateable connector (not shown) associated with additional tubing extending from a compression control unit (not shown) so that the control unit can selectively deliver pressurized air to the respective bladders 3.

**[0003]** The connector 7 is made of a hard plastic and can cause discomfort to the wearer when it comes into contact with the wearer's skin. Although the sleeve underlies the connector 7 and provides a barrier to contact with the skin, the sleeve and/or connector may move in use causing the connector to contact the skin past the distal or lower edge of the sleeve. Therefore, there exists a need for a compression sleeve that reduces the likelihood that the connector will come into contact with the wearer, thus reducing the discomfort caused by the sleeve.

### SUMMARY OF THE INVENTION

**[0004]** In one aspect, a compression garment for applying compression therapy to a wearer's body generally comprises a compression sleeve having a proximal edge and a distal edge. The sleeve includes at least one bladder. A tube is attached to the bladder. A connector on the tube connects the tube to a source of compressed fluid for inflating the bladder. The distal edge of the compression sleeve has a first portion and a second portion jutting distally from the first portion. The second portion includes at least a section generally aligned with the connector and spaced distally of the connector

**[0005]** Other objects and features will be in part apparent and in part pointed out hereinafter.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0006]** Fig. 1 is a front view of a compression sleeve of the prior art having portions of the sleeve broken away; and

**[0007]** Fig. 2 is a front view of a compression sleeve of the present invention having portions of the sleeve broken away.

**[0008]** Corresponding reference characters indicate corresponding parts throughout the drawings.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0009]** Referring now to Fig. 2, a compression garment (or "sleeve") of the present invention is generally indicated at 11. The compression garment is configured to apply repeated, sequential, compression therapy to a limb of a wearer. The sleeve 11 is a knee-length sleeve sized and shaped for being disposed around a leg of the wearer. It will be understood that the compression sleeve may come in different configurations, such as a thigh-length sleeve. Other types of compression devices for being disposed about other limbs of the wearer's body are within the scope of this invention as well. These include devices that do not apply compression repeatedly and/or sequentially.

**[0010]** In the illustrated embodiment, the compression sleeve 11 comprises four layers secured together. The compression sleeve 11 comprises an inner layer, generally indicated at 13, on which a first intermediate layer (broadly, a first bladder layer), generally indicated at 15, is overlaid. A second intermediate layer (broadly, a second bladder layer), generally indicated at 17, overlies the first intermediate layer 15 and is secured thereto. An outer layer or cover generally indicated at 19, overlies and is secured to the second intermediate layer 17. The layers 13-19 may be secured together in any suitable manner as by radiofrequency welding, adhesive, or other chemical and/or mechanical process. In the illustrated embodiment, the layers 13-19 are secured about a periphery 21 of the sleeve 11 forming a proximal edge 22 and a distal edge 24. In use, the inner layer 13 is disposed most adjacent to the limb of the wearer and is in contact with the limb of the wearer, and the outer cover 19 is most distant from the limb of the wearer. The scope of the present invention is not limited to four layers. Also, it is understood that the configuration of the layers of the sleeve can be different than that disclosed in the illustrated embodiment.

**[0011]** The first and second intermediate layers 15, 17 respectively, each include a single sheet of elastic material (broadly, "bladder material"). For example, the sheets 15, 17 are made of a pliable PVC material. The inner and outer layers 13, 19 are made of a polyester material. The inner layer 13 can be absorbent and have a soft texture to provide a comfortable interface with the wearer's body. The second intermediate layer 17 is sealingly secured to the first intermediate layer 15 along bladder seam lines 23 defining a proximal bladder 25, an intermediate bladder 27 and a distal bladder 29, respectively, that are spaced apart longitudinally along the sleeve 11. It is understood that the intermediate layers 15, 17 may be secured together at other locations, such

as around their peripheries. Also, the number of bladders may be other than three without departing from the scope of the present invention. As used herein, the terms "proximal", "distal", and "intermediate" represent relative locations of components, parts and the like of the compression sleeve when the sleeve is secured to the wearer's limb. As such, a "proximal" component or the like is disposed most adjacent to a point of attachment of the wearer's limb to the wearer's torso, a "distal" component is disposed most distant from the point of attachment, and an "intermediate" component is disposed generally anywhere between the proximal and distal components.

**[0012]** Each bladder 25, 27, 29 receives fluid from a source of compressed fluid, (not shown) via a dedicated proximal bladder tube 31, intermediate bladder tube 33, or distal bladder tube 35, respectively for inflating the bladders. However, a tube line need not be dedicated to a bladder to practice the invention. Each tube 31, 33, 35 is disposed, at least partially, between the second intermediate layer 17 and the outer cover 19, and secured between the first and second intermediate layers 15, 17 to the respective bladders 25, 27, 29 by the respective bladder seam lines 23. Other ways of securing the tubes 31-35 to the bladders 25-29 are within the scope of the invention. Distal ends of the tubes 31, 33, 35 are ganged together using a connector 41 that is adapted to fluidly connect the tubes to the source of compressed fluid. The source of compressed fluid may be an air compressor under the control of a microprocessor that sequentially pressurizes the bladders as is generally known in the art. An exemplary air compressor is described in U.S. Patent No. 5,876,359 to Bock, the disclosure of which is incorporated herein by reference.

**[0013]** The sleeve 11 includes a projecting tab or "shield" 45 including a second portion P2 of the distal edge 24 of the sleeve such that a section S of the second portion is disposed generally distal to the connector 41. In the illustrated embodiment, the shield 45 partially underlies the connector 41 and protects the wearer's skin from contact with the connector. It is understood that the shield 45 could completely underlie the connector 41 or alternatively, the connector could be disposed substantially proximal to the shield such that the shield does not underlie the connector. A first portion P1 of the distal edge 24 is disposed generally proximal to the section S and the connector 41. The second portion P2 juts distally from the first portion P1 such that the section S of the second portion is disposed generally distal to the first portion and the connector 41.

**[0014]** In the illustrated embodiment, the shield 45 comprises a V-shaped extension on the layers 13-19 of the sleeve 11. Configurations other than the V-shaped extension are within the scope of the invention. For instance, the extension can be rounded, square or any other suitable shape. It is understood that the shield 45 can be formed in just one of the inner and outer layers 13, 19 or in any one or combination of the layers 13-19 of the sleeve 11. The illustrated embodiment shows the

shield 45 as an integral extension of the sheet material. However, it is within the scope of the invention for the shield 45 to be formed from a separate sheet material and permanently or releasably attached to the layers 13-19 in a suitable manner such as by hook and loop fasteners. Additionally, the shield 45 can be formed from a material other than sheet material. The shield 45 increases the area of the sleeve 11 to provide a barrier for preventing the connector 41 from contacting the wearer's leg should the sleeve or connector move during use.

**[0015]** When introducing elements of the present invention or the preferred embodiments(s) thereof, the articles "a", "an", "the" and "said" are intended to mean that there are one or more of the elements. The terms "comprising", "including" and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

**[0016]** In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

**[0017]** As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

## Claims

1. A compression garment for applying compression therapy to a wearer's body, the garment comprising:
  - a compression sleeve (11) having a proximal edge (22) and a distal edge (24), the sleeve including at least one bladder (25, 27, 29);
  - a tube (31, 33, 35) attached to the at least one bladder (25, 27, 29); and
  - a connector (41) on the tube (31, 33, 35) for connecting the tube to a source of compressed fluid for inflating the bladder;
  - the distal edge (24) of the compression sleeve having a first portion (P1) and a second portion (P2) jutting distally from the first portion, the second portion (P2) including at least a section (S) generally aligned with the connector (41) and spaced distally of the connector (41).
2. The compression garment of claim 1 wherein the section (S) of the second portion (P2) is disposed generally distal of the first portion (P1) of the distal edge (24) of the compression sleeve (11).
3. The compression garment of claim 2 wherein the compression sleeve (11) further comprises a distally projecting tab (45) including at least the section (S) of the second distal edge portion.

4. The compression garment of claim 3 wherein the tab (45) is generally V-shaped.
5. The compression garment of any one of claims 1-4 wherein the compression sleeve (11) comprises a plurality of bladders (25, 27, 29) and a tube (31, 33, 35), attached to each of the bladders, each tube being connected to the connector (41). 5
6. The compression garment of claim 3 or 4 wherein the compression sleeve comprises an outer layer (19) over the bladder that forms at least a part of the distally projecting tab (45). 10
7. The compression garment of any one of claims 3, 4 and 6 wherein the compression sleeve comprises an inner layer (13) under the bladder. 15
8. The compression garment of claim 7 wherein the inner layer forms at least a part of the projecting tab (45). 20
9. The compression garment of any one of claims 3, 4 or 6 wherein the compression sleeve (11) comprises an inner layer (45) forming at least a part of the projecting tab. 25
10. The compression garment of any one of claims 7-9 wherein the inner layer (45) is absorbent and has a soft texture to provide a comfortable interface with the wearer's body. 30

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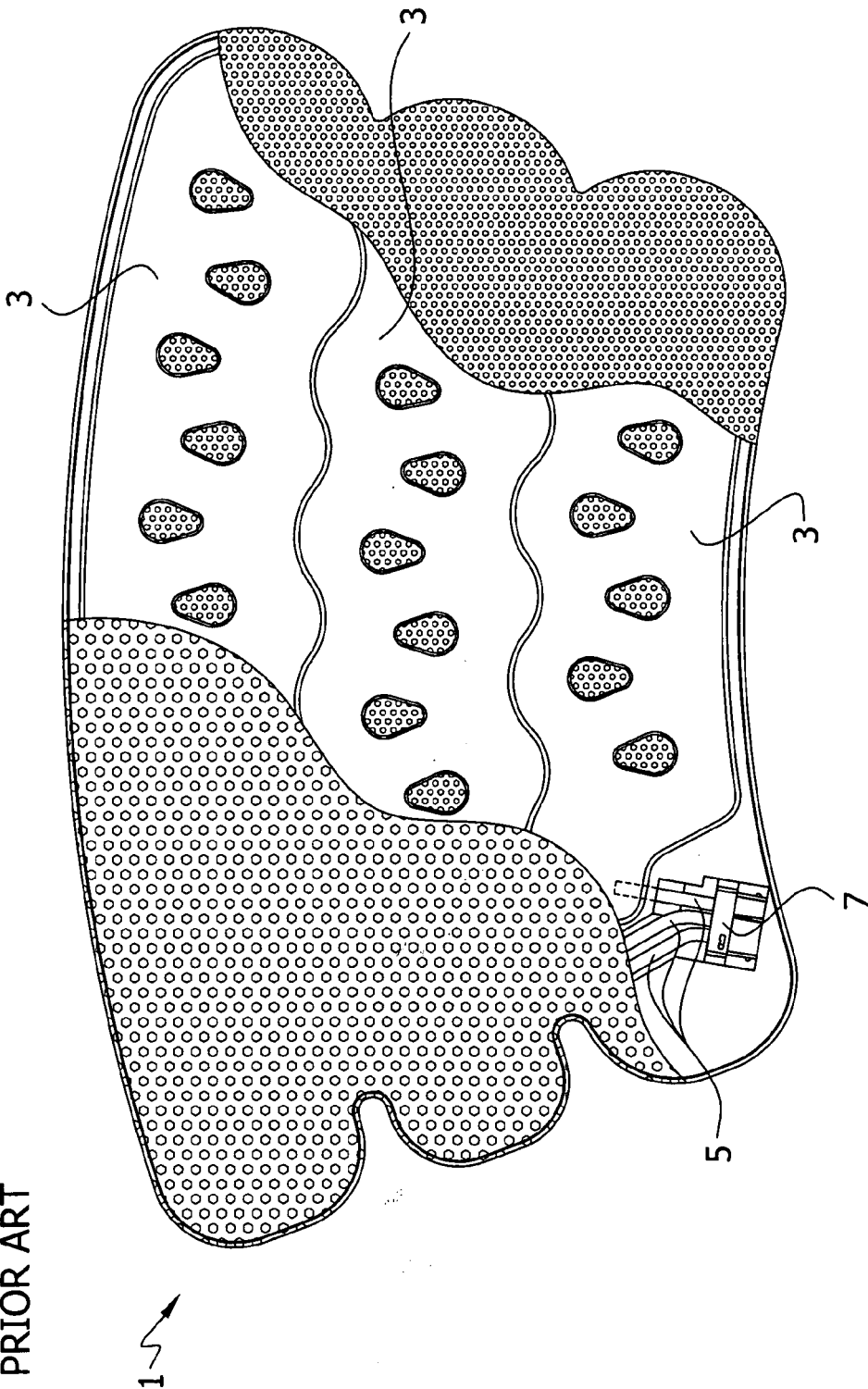
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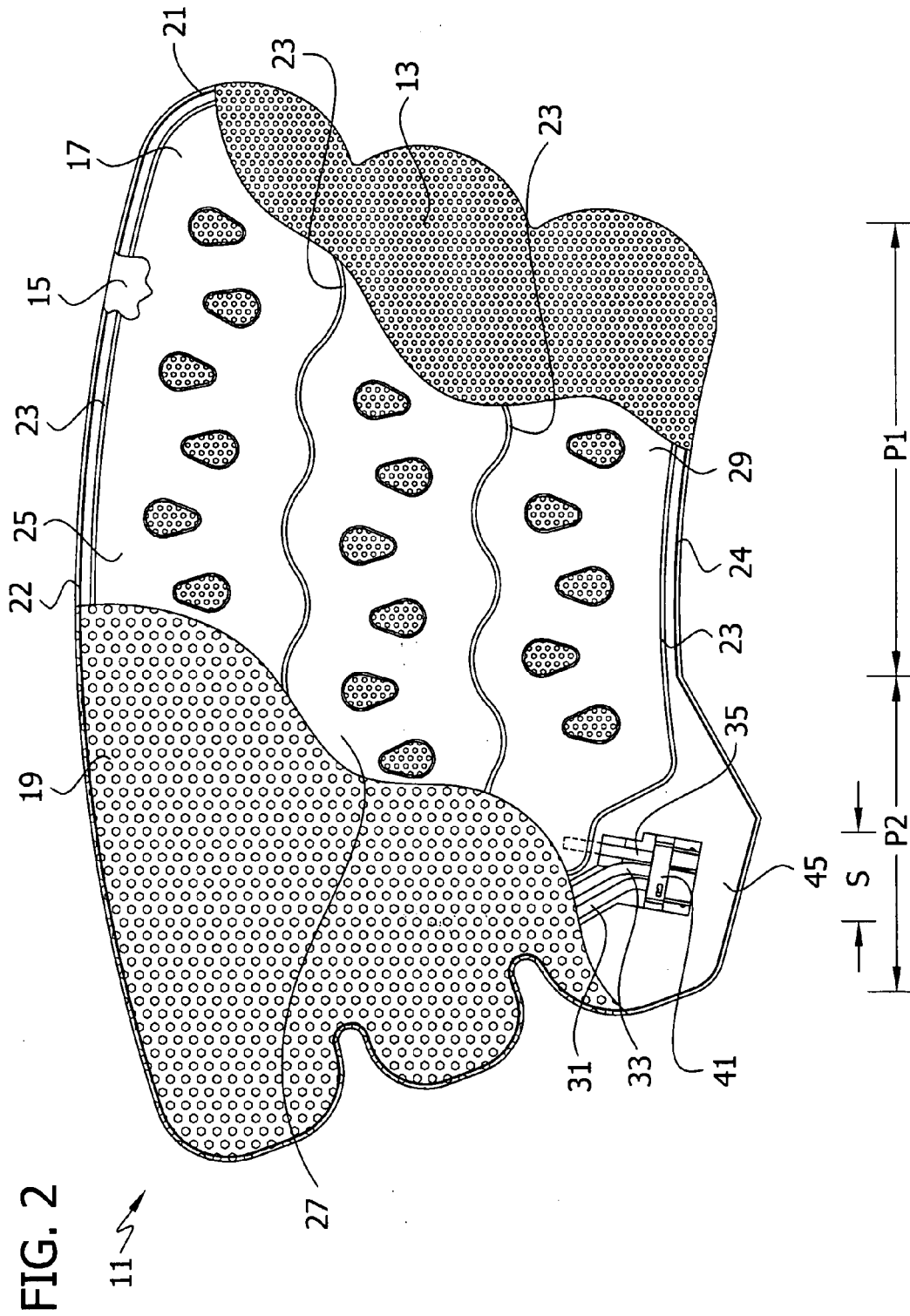
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FIG. 1  
PRIOR ART





**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- US 5876359 A, Bock [0012]